

**FIRST RECORD OF THE ORANGE-SPOTTED GROUPER, *EPINEPHELUS COIODES* (PERCIFORMES: SERRANIDAE) IN THE NORTH-ADRIATIC SEA. Paolo PARENTI**, Department of Environmental Sciences, P. zza della Scienza 1, 20126 Milano, [paolo.parenti@unimib.it] & **Nicola BRESSI**, Section of Biokarstic Sciences, Trieste Natural History Museum, P. zza Hortis, 4, 34123 Trieste, ITALY.

**RÉSUMÉ.** Premier signalement du mérou à taches oranges *Epinephelus coioides* (Perciformes: Serranidae) dans le nord de l'Adriatique.

Un spécimen du mérou à taches oranges *Epinephelus coioides* (Hamilton, 1822) a été capturé le 16 mai 1998 dans le Golfe de Trieste (Adriatique septentrionale) à 0,9 km de la côte italienne ; il mesurait 12 cm de longueur totale. Le poisson, qui est conservé à l'Aquarium Marin de Trieste, mesure aujourd'hui 52 cm LT. La capture dans les eaux de la mer Adriatique d'*E. coioides*, une espèce de l'Indo-Pacifique sporadique dans la Méditerranée sud-orientale, conforte l'hypothèse du réchauffement actuel des eaux de la Méditerranée septentrionale.

**Keywords.** Serranidae - *Epinephelus coioides* - MED - Adriatic Sea - Warming - First record.

The species of the genus *Epinephelus* (Serranidae: Epinephelinae) are mostly found in tropical and subtropical seas. Only five of the 99 species described in the genus (Heemstra and Randall, 1993; Allen and Robertson, 1999) are commonly found in the temperate waters of the eastern Atlantic and Mediterranean Sea. They are: *E. nebulosus* (Geoffroy Saint-Hilaire, 1817), *E. laevis* (Valenciennes, 1843), *E. costae* (Steindachner, 1878), *E. laifensis* Ben-Tuvia, 1953, and

*E. marginatus* (Lowe, 1834). *Mycteroperca rubra* (Bloch, 1793) is another native epinepheline. Two additional species (*E. coioides* and *E. malabaricus*) are now among the Indo-Pacific fishes that have entered the Mediterranean via the Suez Canal (Heemstra and Randall, 1993). The adaptation of tropical species to the Mediterranean conditions has been interpreted to be a consequence of warming process of the Mediterranean basin (Francour *et al.*, 1994; Zabala *et al.*, 1997; Dulčić *et al.*, 1999). This hypothesis received further support by the recent capture of two specimens of *E. nebulosus* from the Adriatic Sea at about 42°N (Glamuzina *et al.*, 2000).

In this paper we present data on the first record of *Epinephelus coioides* (Hamilton, 1822) from the northern Adriatic Sea. The species has been previously recorded from the Mediterranean only from the coast of Israel.

#### Results

The orange-spotted grouper *Epinephelus coioides* occurs from the Red Sea, southwards to at least Durban, and eastwards to Ryukyu Islands, Palau, and Fiji. The first specimen that was recorded from the Mediterranean Sea was misidentified by Ben-Tuvia and Lourie (1969) as "*Epinephelus tauvina*". Another specimen was also caught in Haifa Bay and local fishermen said this species was caught on rare occasions. An orange-spotted grouper specimen of 12 cm TL was caught by fishing net on 16 May 1998 about 0.9 km from Trieste, northern Italy, 45°37'N latitude (Fig. 1) and then maintained at the Civic Marine Aquarium of Trieste. Presently the specimen measures 52 cm TL (Fig. 2). *E. coioides* has been often confused with *E. malabaricus* and *E. tauvina*, but this latter was never been recorded from the Mediterranean Sea. Heemstra and Golani (1993) provided a list of characters that aid in the identification of these three species. The main

Table 1. Comparison of caught orange spotted grouper, *Epinephelus coioides* (MCSN-Ts/cep 1185) and *E. coioides*, *E. malabaricus* and *E. tauvina* as given by Heemstra and Golani (1993).

Characteristics	<i>E. coioides</i>	<i>E. malabaricus</i>	<i>E. tauvina</i>	MCSN-Ts/cep 1185
Dorsal fin rays	XI, 14-16	XI, 14-16	XI, 14-16	XI, 15
White spots on body	absent	present	absent	absent
Preopercle shape	subangular	subangular	rounded	subangular
Lateral line scales	ctenoid	ctenoid	smooth	ctenoid
Upper jaw length (%SL)	17-20	17-22	21-24	18.5

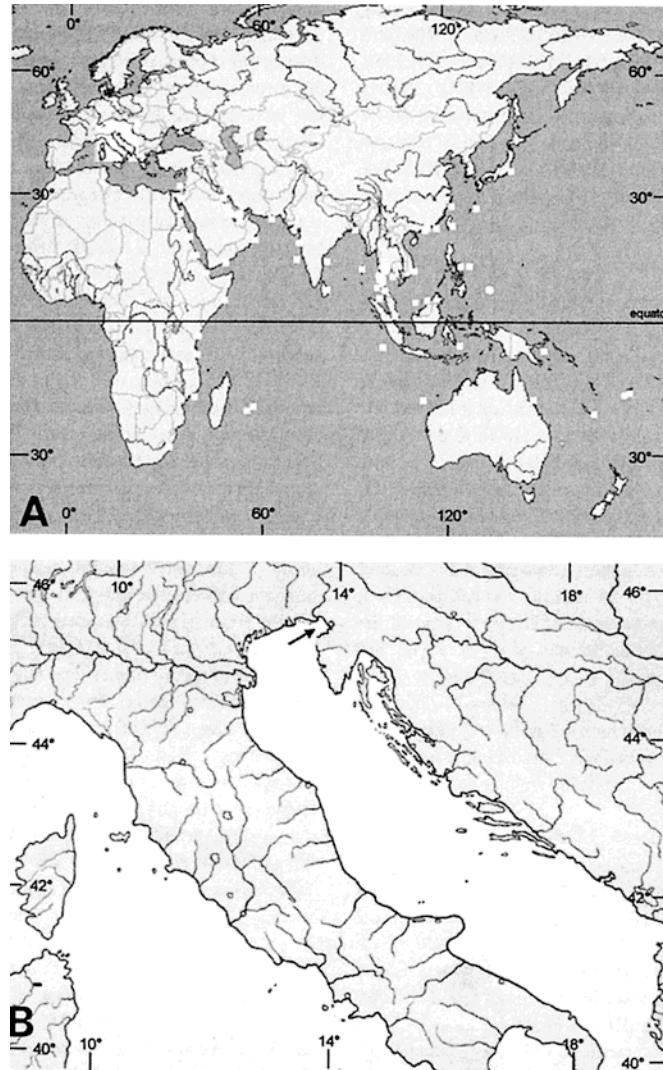


Fig. 1. **A**: Distribution of *Epinephelus coioides* (after Heemstra and Randall, 1993 as reported in Fish-Base, [www.fishbase.org](http://www.fishbase.org)). **B**: Map of the area where the specimen was caught (arrow).

characteristics for distinguishing *E. coioides* from *E. alabaricus* is the presence of orange or reddish brown spots on head and body against dark brown or black spots with irregular white spots or blotches. As depicted in figure 2, color pattern fits with that of *E. coioides*. All other important characters also fit well with those reported for this species (Table I).

#### Discussion

Fifty-eight species of fishes native of the Indo-Pacific have been found in the Mediterranean Sea ([www.ciesm.org/atlas/appendix1.html](http://www.ciesm.org/atlas/appendix1.html)). In most instances their presence is sporadic, based on few specimens caught in the eastern Mediterranean. This is the case of *E. coioides* and *E. alabaricus*, two closely related and similar species in appearances, presently known only from the coast



Fig. 1. Orange-spotted grouper, *Epinephelus coioides* (MCSN-Ts/cep 1185, 52 cm TL) caught in the Gulf of Trieste on 16 May 1998 and now living in the Aquarium of Trieste (July 2001).

of Israel. The two species occupy the same habitats along continental and large island shores of the Indo-Pacific. They show great adaptability to different water salinity. They are often found in brackish areas and penetrate in water of very low salinity in rivers. The capture of a young specimen of *E. coioides* in the northern Adriatic Sea, about 1,300 km north to the previous records, could be interpreted as a part of a process of colonization of new areas by some grouper species (Dulčić *et al.*, 1999; Glamuzina *et al.*, 2000). This colonization may be an evidence for the warming of Mediterranean waters. A mean sea surface temperature of 17.2°C has been recorded in the Adriatic Sea since 1950 through 1996. Two increases of SST recorded during 1985-87 and 1990-95 correlate with new occurrences of fish species in the Adriatic Sea (Dulčić *et al.*, 1999). Unfortunately no additional specimens of *E. coioides* have been caught or seen in the Adriatic Sea. This single record, based on a juvenile, provides evidence for occasional larval transport from the eastern Mediterranean Sea. The 12 cm SL specimen collected in May 1998 possibly arrived in summer 1997. *E. coioides* adapted to the rocky habitats of the eastern Adriatic Sea, suggesting the ability of the species to colonize shallow seas with limited water exchange. In fact, *E. coioides* is the dominant large grouper of the Persian Gulf, where *E. alabarcus* has never been found (Heemstra and Randall, 1993). The colonization of new areas by these large predators feeding on small fishes,

shrimps, crabs, and cephalopods, might affect the patterns of distribution and abundance of native fish species.

Mediterranean groupers are a current research topic studied by the "Groupe d'Étude du Mérou", an association which joins Mediterranean ichthyologists, laboratories and marine protected areas (parks, reserves). In the first symposium on Mediterranean groupers in 1998, it has been shown that *E. marginatus* breeds again in the North. This first record enters well in the framework of these studies, and is important for the "grouper ichthyologist community".

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